SOUTHERN FOREST EXPERIMENT STATION

1965

U.S. FOREST SERVICE RESEARCH NOTE

SO-28

Forest Service, U. S. Dept. of Agriculture

T-10210 FEDERAL BLDG. 701 LOYOLA AVENUE NEW ORLEANS, LA. 70113

FOREST SPECIES COMPARED IN OZARK PLANTATIONS

William R. Maple

SOUTHERN FOREST EXPERIMENT STATION

Fifteen years ago a series of plantations containing native and nonnative forest tree species was established on the Henry R. Koen Experimental Forest in Newton County. The sites, which were representative of abandoned fields in the Arkansas portion of the Ozark Mountains, included loamy sand, silty clay loam, and cherty silt loam soils. All had similar histories of row-cropping and pasturing. The cherty silt loam sites were on ridgetops.

Native species included shortleaf pine *(Pinus echinata* Mill.), eastern redcedar *(Juniperus virginiana* L.), black locust *(Robinia pseudoacacia* L.), and black walnut *(Juglans nigra* L.). Nonnative species included loblolly pine *(Pinus taeda* L.), eastern white pine *(P. strobus* L.), pitch pine *(P. rigida* Mill.), Virginia pine *(P. virginiana* Mill.), and yellow-poplar *(Liriodendron tulipifera* L.), all of which are being planted in neighboring States. Except for shortleaf pine grown from Arkansas seed and pitch pine from an unknown source, all stock was from seed collected in eastern Tennessee and grown in TVA nurseries. Seedlings were planted as 1-0 stock at a spacing of 6 by 6 feet.

Survival, height, and diameter after 15 years are summarized by species and site in table 1.

Survival of 50 percent or over after 15 years was selected as the index of adaptability on any particular site.

Shortleaf pine grew taller than any other native species, averaging more than 30 feet in height and 5.0 inches in diameter. Survival was unremarkable, but the seedlings were in poor condition when planted. Local plantations before and since have survived much better.

Black locust demonstrated acceptable survival only on silty clay loam, where it averaged 25 feet in height and 3.4 inches in diameter. It was heavily attacked by locust borers wherever planted. Black walnut survived acceptably on both loamy sand and silty clay loam sites but grew slowly, averaging 14 to 17 feet in height and 1.6 to 1.8 inches in diameter. Eastern redcedar grew reasonably well on loamy sand, becoming 19 feet tall and 3.6 inches in diameter. The seedlings, like those of shortleaf, were in low vigor when planted; in other trials survival has been good.

Table 1.—*Fifteen-year survival and growth of trees planted on abandoned fields on the Henry R. Koen Experimental Forest*

Species	Survival			Total height			Diameter at breast height		
	Loamy sand	Silty clay loam	Cherty silt loam ridgetop	Loamy sand	Silty clay loam	Cherty silt loam ridgetop	Loamy sand	Silty clay loam	Cherty silt loam ridgetop
	Percent			*Feet*			*Inches*		
NATIVE									
Shortleaf pine	59	39	53	33	34	31	5.0	5.5	5.3
Black locust	44	77	...	32	25	...	3.9	3.4	...
Black walnut	59	89	...	17	14	...	1.8	1.6	...
Eastern redcedar	17	44	0	19	15	...	3.6	2.6	...
NONNATIVE									
Loblolly pine	78	94	69	38	35	37	5.7	5.5	6.6
Pitch pine	80	78	78	25	24	24	3.8	3.9	4.5
Virginia pine	65	83	67	36	31	33	5.0	4.7	5.7
Eastern white pine	33	39	11	28	26	33	4.7	4.5	6.1
Yellow-poplar	24	11	78	35	25	41	3.7	2.9	4.6

The nonnative hard pines—loblolly, pitch, and Virginia—surpassed the acceptable level of survival on all sites and grew well. Loblolly was outstanding, growing several feet taller and almost an inch larger in diameter than either of the others on comparable soils. Virginia pine grew both taller and larger than pitch pine.

Eastern white pine survived poorly but made height growth almost equal to that of Virginia pine. The single nonnative hardwood, yellow-poplar, achieved acceptable survival only on the cherty silt loam ridgetop, where it averaged 41 feet tall and 4.6 inches in diameter.

It appears that Ozark residents will risk less by planting high-quality seedlings of native species than by choosing nonnatives. Nevertheless, the performance of loblolly, Virginia, and pitch pines on the three sites studied, and of yellow-poplar on cherty silt loam ridgetops, certainly qualifies these species for consideration.